

**Louisiana Department of Environmental Quality (LDEQ)
Office of Environmental Services**

STATEMENT OF BASIS

**Units 291/1391/1791/1792
Naphfining, Catalytic Reforming, Aromatic Extraction, Thermal Hydrodealkylation Units
Alliance Refinery
ConocoPhillips Company
Belle Chasse, Plaquemines Parish, Louisiana
Agency Interest Number: 2418
Activity Number: PER19960010
Draft Permit No. 2775-V0**

I. APPLICANT:

Company:

ConocoPhillips Company
P.O. Box 176, Belle Chasse, LA 70037

Facility:

Alliance Refinery
15551 Hwy 23, Belle Chasse, Plaquemines Parish, Louisiana
Approximate UTM coordinates are 211.51 kilometers East and 3,286.84 kilometers North, Zone 16

II. FACILITY AND CURRENT PERMIT STATUS:

ConocoPhillips Company owns and operates the Alliance Refinery, a petroleum refinery located in Belle Chasse, Louisiana. Gulf Oil Company built the refinery in 1970. BP Oil Company owned Alliance Refinery from 1985 until Tosco Corporation (Tosco) purchased it in September 2000. Tosco later became a wholly owned subsidiary of Phillips Petroleum Company on September 17, 2001. On August 30, 2002, Phillips Petroleum Company, including its subsidiary Tosco Corporation, completed a merger with Conoco Inc. to form ConocoPhillips Company. On January 1, 2003, the owner and operator of the Alliance Refinery formally changed from Tosco to ConocoPhillips Company.

Alliance Refinery produces a wide range of petroleum products from crude oil, such as motor gasoline, jet fuel, diesel fuel, LPG, carbon black feedstock, propane, and coke. It also produces by-product elemental sulfur and petrochemicals such as benzene, toluene, and xylene. The plant is covered by Standard Industrial Classification (SIC) 2911.

The Naphfining Unit (NU), Unit 291, reduces the sulfur, nitrogen, and oxygen content of Catalytic Reforming Unit (CRU), Unit 1391, feed. This is accomplished by treating the

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naphtha with hydrogen in the presence of a catalyst at an elevated temperature. The naphtha feed is combined with hydrogen-rich gas entering the unit. The combined stream is heated and passed through the reactor. The reactor effluent is partially cooled, combined with excess hydrogen-rich gas, and cooled further. The resulting vapor-liquid mixture is then flashed in a separator. The separator off-gas is utilized as hydrogen feed for other hydrotreating units. The liquid from the separation of the reactor effluent is sent to the Deisohexanizer for fractionation. The deisohexanizer overheads (both gas and liquid) are routed to the Saturated Gas Unit, Unit 7991, for further processing.

The deisohexanizer bottoms product treated naphtha is fed to the CRU. The CRU processes the desulfurized blend of deisohexanized straight run naphtha from the NU and coker naphtha. The CRU produces Depentanized Reformate, Hydrogen, Depentanized Overhead Vapor, and Depentanized Overhead Liquid. The reformate is fed to the Reformate Splitter Column, 1791-V-1 (Unit 1791 – Aromatic Extraction Unit), which is physically located in Unit 1391. The Splitter overhead product is charged via intermediate storage to Unit 1791 for the aromatics extraction process. The heavy reformate produced is sent to storage for use in gasoline blending.

The Aromatic Extraction Unit (AEU), Unit 1791, extracts aromatics from reformate produced in the Catalytic Reforming Unit (CRU). The reformate is first split into light and heavy fractions. Light Reformate is introduced into the Extractor Column where a counter-current flow of solvent extracts the aromatic compounds. The Raffinate stream, containing the non-aromatic fraction of the feed, is fed to the Raffinate Splitter Column. The products from this column, Light and Heavy Raffinate, are used for gasoline, diesel, and jet-fuel blending. The solvent-aromatics mixture from the Extractor Column is heated in the Recovery Column where aromatics are fractionated overhead. The overhead (benzene, toluene, and xylenes) is fed to the Benzene Column to be fractionated into xylene and a benzene-toluene mixture. Xylene is shipped via marine vessels; the benzene-toluene mixture is feedstock to the Thermal Hydrodealkylation Unit (THDU), Unit 1792, where benzene is produced.

A benzene/toluene mixture either from the Aromatics Extraction Unit (AEU) or purchased off-site is preheated by the Hydrodealkylation Charge Heater and then combined with unconverted toluene from the THDU reactor, benzene/toluene mixture from the benzene recovery unit, and hydrogen. The combined streams are fed to the hydrogenation reactor to remove impurities. The hydrogenation reactor effluent is cooled and the components are separated. A portion of the separated vapor is used as recycle hydrogen. The other portion of the vapor is processed by the Benzene Recovery Unit (BRU). The remaining gas is sent to the refinery fuel gas system. The separator liquid is sent to the Benzene Tower for fractionation into benzene product, toluene, and heavy aromatics. The toluene and aromatics are routed to the THDU reactor for conversion into benzene.

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In addition, the facility has several state permits that will remain effective until replaced by a Part 70 permit. These include:

Permit Number	Units or Sources	Date Issued
33	Refinery Wide	10/20/70
1607T	Flare Gas Compressor	08/17/81
2163	Benzene Recovery Unit	10/08/92
2180	Source 191-H-3	03/04/93

Several Part 70 and PSD permits addressing portions of the facility have already been issued. These include:

Permit Number	Units or Sources	Unit Name	Date Issued
PSD-LA-75(M-2)	Unit 301	Boilers	10/13/87
PSD-LA-624	Source 301-B-3	Supplemental Boiler	09/16/98
2593-V0	Unit 293	Gulfining Unit	02/08/99
2113-V0	Unit 292	Diesel Hydrotreater Unit	12/07/00
2513-V4	Unit 412	Offsites	12/07/05
2776-V0	Unit 7591	Merox Treater Unit	10/18/02
2511-V2	Unit 891	Delayed Coking Unit	11/16/05
2840-V0	Unit 294	Low Sulfur Gasoline Unit	10/03/03
PSD-LA-696	Unit 294	Low Sulfur Gasoline Unit	10/03/03
2512-V1	Unit 491 & Unit 6191	HF Alkylation & Light Ends Recovery Unit	10/08/03
2778-V0	Unit 303	Utilities	08/16/04
2774-V1	Unit 591/592	Sulfur Recovery Unit	09/21/05
1810-V2	Unit 1291/301	Fluidized Catalytic Cracking Unit/CO Boilers	02/22/05
1870-V0	Unit 308W	Wastewater Treatment Unit	08/23/05
2313-V0	Unit 406	Marine Loading and Transfer Operations	02/09/06

Finally, several applications for initial Part 70 permits addressing the remaining portions of the facility are still under review by the department. These include:

Units	Unit Name
Unit 291/1391	Naphfining/Catalytic Reforming Unit
Unit 1791/1792	Aromatic Extraction/Thermal Hydrodealkylation Unit
Unit 191/7991	Crude Unit/Saturated Gas Unit
Unit 308F	Flares

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III. PROPOSED PERMIT / PROJECT INFORMATION:

Permit Application Submittal Information

BP Oil Company submitted applications and Emission Inventory Questionnaires (EIQ) dated October 7, 1996, requesting Part 70 permits for Unit 291, Unit 1391, Unit 1791, and Unit 1792. ConocoPhillips Company submitted a revised application and Emission Inventory Questionnaire (EIQ) dated February 8, 2002, requesting a Part 70 permit for Unit 291 and Unit 1391. ConocoPhillips Company submitted a revised application and Emission Inventory Questionnaire (EIQ) dated April 8, 2002, requesting a Part 70 permit for Unit 1791 and Unit 1792. Additional information, dated August 7, 2002, was also submitted.

Project description

ConocoPhillips Company proposes the following changes:

- Combine emissions sources from Unit 291-Naphfining Unit, Unit 1391-Catalytic Reforming Unit, Unit 1791-Aromatic Extraction Unit, and Unit 1792-Thermal Hydrodealkylation into one permit.
- Reconcile fugitive component emissions to incorporate updated fugitive component counts and approved consolidated Leak Detection and Repair (LDAR) Programs.
- Reconcile emission estimations to reflect the installation of Ultra Low NO_x Burners (ULNB) on emission point sources 1391-H-1, 1391-H-2/3, and 1792-H-1. The installation of the ULNB was previously approved by an authorization to construct dated September 6, 2001.
- Cap emissions for seven heaters into Complex 5 Heater Cap, Emission Point No. C5-H, for the following emission sources:
 - Naphfiner Reactor Feed Heater, Emission Point No. 291-H-1
 - Naphfiner Deisohexanizer Reboiler, Emission Point No. 291-H-2
 - Catalytic Reformer Feed Heater No. 1, Emission Point No. 1391-H-1
 - Catalytic Reformer Feed Heater No. 2 and 3, Emission Point No. 1391-H-2/3
 - Depentanizer Reboiler, Emission Point No. 1391-H-4
 - Reformate Splitter Reboiler, Emission Point No. 1791-H-1
 - Hydrodealkylation Charge Heater, Emission Point No. 1792-H-2

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Permitted Air Emissions

Estimated emissions in tons per year are as follows:

<u>Pollutant</u>	<u>Emissions</u>
PM ₁₀	29.04
SO ₂	104.83
NO _x	408.42
CO	101.82
VOC	378.10

Prevention of Significant Deterioration Applicability

These units are part of the Petrochemical Production Reconciliation (PPR) Project. A Prevention of Significant Deterioration (PSD) evaluation was performed for the PPR project modifications, which includes the installation of Ultra Low NO_x Burners (ULNB) on 1391-H-1, 1391-H-2/3, and 1792-H-1.

“Actual” to “Potential” emission increases for the modification in tons per year are as follows:

Pollutant	Actual	Potential	Change	PSD De Minimis
PM ₁₀	27.37	29.63	+ 2.26	15
SO ₂	97.54	104.08	+ 6.54	40
NO _x	780.16	416.28	-363.88	40
CO	93.27	108.42	+ 15.15	100
VOC	39.55	74.48	+ 34.93	40

An actual to potential analysis of the project showed that no pollutant increased in excess of its significance level listed above. Prevention of Significant Deterioration (PSD) review is not required.

This application was reviewed for compliance with the Louisiana Preconstruction and Part 70 operating permit program. It was also reviewed for compliance with Louisiana Air Quality Regulations, National Emission Standards for Hazardous Air Pollutants (NESHAP), and New Source Performance Standards (NSPS). Prevention of Significant Deterioration (PSD) does not apply.

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MACT requirements

Compliance with the Louisiana Fugitive Emission Consolidation Program, with LA Refinery MACT being the most stringent program for Unit 291 and Unit 1391 and 40 CFR 63 Subpart H, SOCM I MACT being the most stringent program for Unit 1791 and Unit 1792, is determined as MACT for fugitive emissions. The Low Pressure Flare, Emission Point No. 308F-D-1 (Permit No. 2779-V0), acts as a control device for several process vents in Unit 1791 and Unit 1972. The flares are operated in accordance with 40 CFR 60 Subpart A and 40 CFR 63 Subpart A to ensure proper destruction of HAPs and TAPs.

Air Modeling Analysis

Dispersion Model(s) Used: ISCST3 (Screen by LDEQ)

Pollutant	Time Period	Calculated Maximum Ground Level Concentration	Louisiana Air Quality Standard (NAAQS)
NO _x	Annual	20.56 µg/m ³	100 µg/m ³
	3-hour	455.88 µg/m ³	1300 µg/m ³
SO ₂	24-hour	264.25 µg/m ³	365 µg/m ³
	Annual	25.31 µg/m ³	80 µg/m ³

The dispersion model was run for the Clean Fuels project. The screening model results for SO₂ were added to the Clean Fuels results since the 2005 flare study resulted in a significant increase of SO₂ emission estimates.

Impact on air quality from Units 291/1391/1791/1792 will be below the National Ambient Air Quality Standards (NAAQS) and the Louisiana Ambient Air Standards (AAS) beyond industrial property.

General Condition XVII Activities

The facility will comply with the applicable requirements of General Condition XVII of the Louisiana Air Emission Permit General Conditions in the Title V Permit. For a list of approved General Condition XVII Activities, refer to Section VIII of the draft Part 70 permit. These releases are small and will have an insignificant impact on air quality.

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Insignificant Activities

All Insignificant Activities are authorized under LAC 33:III.501.B.5. For a list of approved Insignificant Activities, refer to Section IX of the draft Part 70 permit.

IV. Permit Shields

A permit shield was not requested.

V. Periodic Monitoring

Fugitive emissions must be monitored according to the provisions of 40 CFR 63, Subpart H, SOCMHON MACT and/or Louisiana Refinery MACT.

VI. Applicability and Exemptions of Selected Subject Items

Regulatory applicability, standards, monitoring, reporting and recordkeeping requirements are provided in the Facility Specific Requirements Section of the draft permit. The table below summarizes highlights of the regulatory applicability for each emission point.

Source ID No.:	Requirement	Applicability
Facility – Units 291/1391/1791/1792	40 CFR 61.340 Subpart FF– National Emission Standard for Benzene Waste Operations.	Refinery has > 10 Mg/yr benzene from waste and must meet control, reporting, and recordkeeping requirements. (See Title V Permit, Unit 308W, Wastewater Treatment Unit.)

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Source ID No.:	Requirement	Applicability
291-H-1 Naphfiner Reactor Heater	LAC 33:III.1101.B – Control of Emissions of Smoke	Emissions of smoke shall be controlled so shade is not darker than 20 % opacity. Particulate matter source shall be controlled so that the shade or appearance of emissions is not denser than 20 % average opacity, except for >20% for not more than one 6 min. period in any 60 consecutive min.
291-H-2 Naphfiner Deisohexanizer Reboiler		Limit the quantity of particulate matter emitted from fuel burning equipment to <0.6 lb/MMBTU of heat input.
1391-H-1 Catalytic Reformer Feed Heater No. 1	LAC 33:III.1313.C – Emission Standards for Particulate Matter	
1391-H-2/3 Catalytic Reformer Feed Heater No. 2 &3	LAC 33:III.1503.C – Emission Standard for Sulfur Dioxide	EXEMPT. Unit emits <250 tpy SO ₂ .
1391-H-4 Depentanizer Reboiler		
1791-H-1 Reformate Splitter Reboiler	40 CFR 60 Subpart J – Standards of Performance for Petroleum Refineries	Hydrogen Sulfide concentration in fuel gas must be less than 0.10 gr/dscf.
1792-H-1 Hydrodealkylation Charge Heater		
291-FF 291 Unit Fugitives	LAC 33:III.2111 Control of Emissions of Organic Compounds – Pumps and Compressors	All rotary pumps and compressors handling VOC with TVP >= 1.5 psia to be equipped with mechanical seals or equivalent approved equipment.
1391-FF 1391 Unit Fugitives	LAC 33:III.5109.A Comprehensive Toxic Air Pollutant Emission Control Program	Control emissions of toxic air pollutants to a degree that constitutes Maximum Achievable Control Technology (MACT) as approved by DEQ. Compliance with the Louisiana Fugitive Emission Consolidation Program, with LA Refinery MACT, being the most stringent program, is determined as MACT.
1791-FF 1791 Unit Fugitives	LAC 33:III.2111 Control of Emissions of Organic Compounds – Pumps and Compressors	All rotary pumps and compressors handling VOC with TVP >= 1.5 psia to be equipped with mechanical seals or equivalent approved equipment.
1792-FF 1792 Unit Fugitives	LAC 33:III.5109.A Comprehensive Toxic Air Pollutant Emission Control Program	Control emissions of toxic air pollutants to a degree that constitutes Maximum Achievable Control Technology (MACT) as approved by DEQ. Compliance with the Louisiana Fugitive Emission Consolidation Program, with 40 CFR 63 Subpart H, SOCMHON MACT, being the most stringent program, is determined as MACT.

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VII. Streamlined Requirements

Unit or Plant Site	Programs Being Streamlined	Stream Applicability	Overall Most Stringent Program
Unit 291 – Naphfining Unit	LAC 33:III.Chapter 51, LA MACT for Refineries	≥ 5% VOTAP (Class I + II)	LA MACT for Refineries
Unit 1391- Catalytic Reforming Unit	40 CFR 63, Subpart CC NESHAP – Petroleum Refineries	≥ 5% organic HAP	
	LAC 33:III.2121, Louisiana Fugitive Emission Control	≥ 10% VOC	
Unit 1791 – Aromatic Extraction	40 CFR 63, Subpart H, SOCMH HON MACT	≥ 5% organic HAP	40 CFR 63 Subpart H SOCMH HON MACT
Unit 1792 – Thermal Hydrodealkylation Unit	LAC 33:III.2121, Louisiana Fugitive Emission Control	≥ 10% VOC	

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VIII. Glossary

Best Available Control Technologies (BACT) - An emissions limitation (including a visible emission standard) based on the maximum degree of reduction for each pollutant subject to regulation under this part which would be emitted from any proposed major stationary source or major modification which the administrative authority, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such source or modification through application of production processes or available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for control of such pollutant.

CAM - Compliance Assurance Monitoring rule – A federal air regulation under 40 CFR Part 64

Carbon Black - A black colloidal substance consisting wholly or principally of amorphous carbon and used to make pigments and ink.

Carbon Monoxide (CO) – (Carbon monoxide) a colorless, odorless gas produced by incomplete combustion of any carbonaceous (gasoline, natural gas, coal, oil, etc.) material.

Cooling Tower – A cooling system used in industry to cool hot water (by partial evaporation) before reusing it as a coolant.

Continuous Emission Monitoring System (CEMS) – The total combined equipment and systems required to continuously determine air contaminants and diluent gas concentrations and/or mass emission rate of a source effluent.

Cyclone – A control device that uses centrifugal force to separate particulate matter from the carrier gas stream.

Duct Burner – A device that combusts fuel and that is placed in the exhaust duct from another source (such as a stationary gas turbine, internal combustion engine, kiln, etc.) to allow the firing of additional fuel to heat the exhaust gases before the exhaust gases enter a steam generating unit.

Federally Enforceable Specific Condition - A federally enforceable specific condition written to limit the potential to Emit (PTE) of a source that is permanent, quantifiable, and practically enforceable. In order to meet these requirements, the draft permit containing the federally enforceable specific condition must be placed on public notice and include the following conditions:

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- A clear statement of the operational limitation or condition which limits the source's potential to emit;
- Recordkeeping requirements related to the operational limitation or condition;
- A requirement that these records be made available for inspection by LDEQ personnel;
- A requirement to report for the previous calendar year.

Grandfathered Status- Those facilities that were under actual construction or operation as of June 19, 1969, the signature date of the original Clean Air Act. These facilities are not required to obtain a permit. Facilities that are subject to Part 70 (Title V) requirements lose grandfathered status and must apply for a permit.

Heat Recovery Steam Generator (HRSG) – A steam generator that recovers exhaust heat from a gas turbine, and provides economizing and steam generation surfaces.

Hydrogen Sulfide (H₂S) - A colorless inflammable gas having the characteristic odor of rotten eggs, and found in many mineral springs. It is produced by the action of acids on metallic sulfides, and is an important chemical reagent.

Maximum Achievable Control Technology (MACT) - The maximum degree of reduction in emissions of each air pollutant subject to LAC 33:III.Chapter 51 (including a prohibition on such emissions, where achievable) that the administrative authority, upon review of submitted MACT compliance plans and other relevant information and taking into consideration the cost of achieving such emission reduction, as well as any non-air-quality health and environmental impacts and energy requirements, determines is achievable through application of measures, processes, methods, systems, or techniques.

NESHAP - National Emission Standards for Hazardous Air Pollutants –Air emission standards for specific types of facilities, as outlined in 40 CFR Parts 61 through 63

Nitrogen Oxides (NO_x) - Compounds whose molecules consists of nitrogen and oxygen.

Nonattainment New Source Review (NNSR) - A New Source Review permitting program for major sources in geographic areas that do not meet the National Ambient Air Quality Standards (NAAQS) at 40 CFR Part 50. Nonattainment NSR is designed to ensure that emissions associated with new or modified sources will be regulated with the goal of improving ambient air quality.

NSPS - New Source Performance Standards – Air emission standards for specific types of facilities, as outlined in 40 CFR Part 60

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Organic Compound - Any compound of carbon and another element. Examples: Methane (CH₄), Ethane (C₂H₆), Carbon Disulfide (CS₂)

Part 70 Operating Permit- Also referred to as a Title V permit, required for major sources as defined in 40 CFR 70 and LAC 33:III.507. Major sources include, but are not limited to, sources which have the potential to emit: ≥ 10 tons per year of any toxic air pollutant; ≥ 25 tons of total toxic air pollutants; and ≥ 100 tons per year of regulated pollutants (unless regulated solely under 112(r) of the Clean Air Act) (25 tons per year for sources in non-attainment parishes).

PM₁₀- Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers as measured by the method in Title 40, Code of Federal Regulations, Part 50, Appendix J.

Potential to Emit (PTE) - The maximum capacity of a stationary source to emit any air pollutant under its physical and operational design.

Prevention of Significant Deterioration (PSD) – A New Source Review permitting program for major sources in geographic areas that meet the National Ambient Air Quality Standards (NAAQS) at 40 CFR Part 50. PSD requirements are designed to ensure that the air quality in attainment areas will not degrade.

Selective Catalytic Reduction (SCR) – A noncombustion control technology that destroys NO_x by injecting a reducing agent (e.g., ammonia) into the flue gas that, in the presence of a catalyst (e.g., vanadium, titanium, or zeolite), converts NO_x into molecular nitrogen and water.

Sulfur Dioxide (SO₂) – An oxide of sulfur.

TAP - Toxic Air Pollutant (LDEQ acronym for air pollutants regulated under LAC 33 Part III, Chapter 51, Tables 1 through 3).

Title V permit – See Part 70 Operating Permit.

“Top Down” approach – An approach which requires use of the most stringent control technology found to be technically feasible and appropriate based on environmental, energy, economic, and cost impacts.

Turbine – A rotary engine in which the kinetic energy of a moving fluid is converted into mechanical energy by causing a bladed rotor to rotate.

Volatile Organic Compound (VOC) - Any organic compound which participates in atmospheric photochemical reactions; that is, any organic compound other than those which the

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administrator of the U.S. Environmental Protection Agency designates as having negligible photochemical reactivity.